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ABSTRACT

This study compared a Piagetian and an Ausubelian preschool program on: (1) the types and frequencies of teacher-child verbalizations and (2) the degree to which these patterns of verbalizations supported teacher stated theoretical and pedagogical principles. Thirty-two 10-minute videotapes of 16 preschool children (8 within each program) recorded teacher and child verbalizations in small instructional groups and in related learning activity sessions. A questionnaire was administered to teachers in each program to establish the theoretical and pedagogical principles underlying the programs. Questionnaire results showed that Ausubelian teachers strongly endorsed only Ausubelian items while Piagetian teachers endorsed items related to their own programs plus several Ausubelian items. Results of observational data indicated that the structuring of small-group instruction in both programs was mainly teacher-directed. This was seen as more consistent with the philosophy of the Ausubelian than the Piagetian program. Teachers from both groups were also found to use similar types and categories of utterances (direct statements in almost all instances) during subsequent learning activities. This was in contrast to the expectation that Piagetian teacher utterances would be more indirect during the free-rotation, activity center sessions. Although there was little similarity between teacher and child utterances during small group learning activities, there appeared to be a modeling effect on child utterances during subsequent learning activities. Overall, it was concluded that a dichotomy existed between the teachers' projected form of verbalizations and what occurred in practice. (JMB)

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# TEACHER AND CHILD VERBALIZATIONS DURING SMALL GROUP AND RELATED LEARNING ACTIVITIES

by

Joseph T. Lawton and Deborah L. Brown

Report from the Project on
Studies of Instructional Programming for the Individual Student

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PS 010250

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## Abstract

The relationships between the aims and teaching methods of both a formal and informal preschool program, and types of verbal utterances used in small group instructional times and related learning activity time were examined.

Thirty-two videotapes were made in order to record and measure type and frequency of teacher and child verbalizations. Within each program, half of the tapes were made during eight small group instructional sessions. The other half of the tapes were made during eight subsequent activity sessions. Two coding systems were established for categorizing: (a) verbal interaction, and (b) task management. The verbal interaction coding system was designed to classify types of teacher and child utterances. Further types of utterances associated with task management were also identified.

In addition, a questionnaire was devised and filled out by the teachers in each program. The intent of the questionnaire was to establish an estimate of the theoretical and pedagogical principles underlining the programs.

The compiled data were analyzed by applying data on teacher-child verbalizations and verbal interactions to: (a) validate teacher stated theoretical and pedagogical principles, and (b) compare types and frequencies of teacher-child verbalizations and verbal interactions occurring within and between both programs in instructional small group and related learn-

ing activities.

It was seen in the results of the questionnaire that the Ausubelian teachers strongly endorsed only Ausubelian items. The Piagetian teachers also endorsed, though not so strongly, items which related to their own program. However, they endorsed several of the Ausubelian items in addition to their own. The most likely explanation for this is that the endorsed items referred to a degree of structure the Piagetian teachers would likely support.

Structuring of small-group instruction in both programs was mainly teacher-directed. The type and category of teacher utterances provided more support for predictions regarding expected teacher verbalizations in the Ausubelian than the Piagetian program. The fact that teachers from both groups used similar types and categories of utterances (almost totally direct statements and questions) during subsequent learning activities was surprising. It was expected that Piagetian teacher utterances would be more indirect during the free-rotation, activity center sessions than was the case. Although there was little similarity between teacher and child utterances during small group learning activities, there appeared to be a modelling effect on child utterances during subsequent learning activities.

Finally, there is some indication from the data that a dichotomy exists between these teachers' projected form of verbalizations and what occurred in practice. Close monitoring of both teacher and child verbalizations seems warranted in order to affect desired adaptations to particular types of teacher-child verbalizations.

# I

## ISSUES IN EARLY CHILDHOOD EDUCATION

In a summary of major issues facing those who assume responsibility for children's education, Evans (1971) identifies three issues. The first issue refers to the question of what is the content of a program? He states that there is a wide range of types of curriculum content being used by existing Early Childhood Education programs. This range of types of curriculum involves several dimensions, including not only the type of content, but also its organization and the degree to which it is structured by adults for children's play and learning encounters. This issue combines with a second issue: the questions of when to teach certain types of content and how content might best be sequenced. These two issues of content and timing are also enmeshed with the issue of how. This third issue is concerned with methodologies of presenting content. Robinson and Robinson (1968) have commented that certain teaching methods may be more suitable at one stage of development than earlier or later stages. Methods which contribute to early mastery may not be appropriate for longer term objectives.

Educators have dealt in various ways with these issues involved in preschool education, and today's programs, whether innovative or based on old forms, take a stand on these same issues. Decisions teachers make with respect to these issues will result in identifiable attitudes towards the selection and organization of curriculum content, teacher role, and

child role.

It can be expected there will be a diversity of types of programs, each with its own special emphases. One means of categorizing a program is to identify the overall structure. The concept of structure can be identified as follows. Structure can be exemplified by reference to degree of teacher-direction and the amount of emphasis placed on teacher-initiated, adult-child, and child-material interactions (e.g., Mayer, 1971). Structure will also be reflected in the style of instruction adopted by the teacher (e.g., Bennett, 1977).

At the present time the University of Wisconsin preschool laboratory is conducting a study comparing two preschool models. One of the two models is based on the developmental theory of Piaget, while the other is based on both David Ausubel's learning theory and Piaget's developmental theory. The Piagetian program can be described as one type of informal program, whereas the Ausubelian program stands as an example of a formally structured program. But neither program is an extreme case of the respective polarities of a formal-informal structure continuum.

A brief description of these two preschool programs now follows.

## The Piagetian Preschool Program

From a Piagetian perspective, genuine learning involves the acquisition of new structures of mental operations. The development of these cognitive structures enables the child to process new information meaningfully.

When genuine learning takes place, the child seems to regulate his own activities; he decides what needs to be learned; he sets the pace; he selects certain kinds of experiences. Such learning is expected to be

enhanced by a teacher who guides, prompts, suggests (but seldom tells), and through peer interaction.

Ginsburg and Opper (1969) state that from the perspective of Piaget's theory, there are grave deficiencies in a teaching approach which directs children through a prescribed sequence of material, or when there is too much emphasis on transmitting material through verbal means, or other such "traditional" methods of instruction, especially in the early years of school. They go on to say that, "formal verbal instruction is generally ineffective, especially for young children" (1969, p. 230). Children's thought and language are expected to be qualitatively different from that of an adult. In addition, generalizations from an adult's experience to that of the child's as reflected in the planning of a curriculum are deemed impossible.

Instead, the Piagetian teacher is advised to set up an environment which offers opportunities for active involvement and experience with materials. The child's investigation of the properties of the environment and the effects of his actions on these properties potentially facilitates his acquisition of physical knowledge. "Given an environment that does provide a large quantity of potential interactions, the child has a high probability of becoming 'armed' with a repertoire of actions with which to experiment, and knowledge of some environmental properties and regularities. With this basis, the construction of operational knowledge is likely to occur" (Ershler, McAllister, & Saunders, 1977).

Piaget sees activity as being dependent on interest, the motivational source of intelligent activity. That he deprecates reliance on verbal receptive instruction is no surprise. He regards the methodology to be

in extreme opposition to active discovery learning.

The challenge, then, for the teacher is to allow the child to form his own intelligence through autonomous active manipulation and representation of his environment. His actions are motivated by his interest. Therefore, the teacher needs to provide a suitable learning environment accompanied by a social interaction which aids the systemization of the child's active intellectual processes.

The University of Wisconsin Piagetian preschool operates Monday through Thursday afternoons. The daily routine includes a class meeting for sharing ideas, show and tell, and discussing various problems that have risen in the past; a small group time to insure social interaction of every child; free rotation of areas in the classroom and outside; clean up; and large group activities to end the day with a group feeling intended to facilitate social interaction and an atmosphere of mutual respect.

One of the underlying components of this schedule entails arranging the physical environment in a manner that is conducive to working in small groups. A choice of materials is easily accessible in order to encourage self-initiated activity, and both social and individual involvement.

A second component requires the teacher to be actively involved, not as a director or demonstrator, but as a coworker with the children. Teachers participate by conversing with the children, accepting their statements and opinions, and offering suggestions and questions that require no specific answer, but stimulate thought, or encourage problem solving. Many problem situations will continue for a long time, with minimal teacher intervention. When establishing rules for the care of materials

and other customary classroom rules rather than authoritarily presenting them to the children, the Piagetian teacher provides opportunities for discussion and understanding.

## Piagetian Program Objectives

The long-term goals listed below, as cited by Ershler et al. (1977), were derived from Piaget's theory. They can be translated into short-term goals appropriate for use with children of different ages.

1. Self-confidence.

2. Appropriate and empathetic interactions with peers and those in other age groups.

3. Initiation of one's own learning experiences by exploring, experimenting, and asking questions of one's self, peers, and adults.

4. Interest in a variety of ways of solving problems as much as in the particular solutions themselves.

5. Critical thinking; that is, having and making use of reasoning strategies necessary for verifying conclusions.

6. Flexibility; that is, relating intelligently and creatively to one's environment.

These goals are associated with the acquisition of the three different types of knowledge (social, physical, and logico-mathematical knowledge) Piaget has identified. Certain principles concerning preschool teaching have been derived from Piaget's theory by various other practitioners (e.g., Furth & Wachs, 1975; Kamii & DeVries, 1977; Saunders, 1976). Modes of structuring social, physical, and logico-mathematical knowledge produce different ways of teaching such knowledge. The teacher's

role, then, entails responding to the children in terms of the kind of knowledge involved.

With regard to social-arbitrary knowledge, the teacher may tell the right answer and reinforce it. In physical knowledge, the teacher usually encourages the child to find the answer directly from objects. In logico-mathematical knowledge, the teacher refrains from telling the right answer or reinforcing it, and instead encourages reflecting abstractions. In general, reflecting abstraction can be encouraged by asking "How do you know?" or any other question which prompts a child to put things into a relationship (Kamii & DeVries, 1977). However, in the broad sweep of learning, these three types of knowledge are expected to interact. Therefore, even with respect to social and physical knowledge it is considered better that the child interact with people, objects, and events and, by this process, acquire meaningful knowledge of the world. This learning is also an active process. The teacher should refrain, as much as possible, from telling.

The form of teacher language behavior in most learning situations might be likened to a "probing interaction; one in which the teacher tries to understand the reasons for the child's actions and responses. It consists of a holding back of 'correct' answers and actions by the teacher, so that the children are doing as much of the thinking as possible" (Ershler et al., 1977, p. 60). Without intruding or interrupting, the teacher interacts with the children in such a was as to encourage them to extend their own ideas. Because of such expectations, the teacher aims to ask open-ended questions, make open-ended statements, and provide verbal instructions encouraging divergent thinking. Children

are expected to be at varying stages of development so that such verbalizations take into account the fact that there are no right or wrong answers. Ershler et al. emphasize that "this restrained behavior of the teacher occurs when operational and representational aspects of figurative knowledge are concerned; it does not necessarily occur when conventional knowledge is involved" (1977, p. 60). The teachers in the Piagetian preschool program are expected to provide these particular types of verbalizations in order to facilitate the children's development.

## The Ausubelian Preschool Program

Ausubel (Ausubel, 1963; Ausubel & Robinson, 1969) has concentrated on trying to explain how pupils apply verbal concepts and generalizations and how they apply these to the solving of problems. "A critical feature of the theory is the concept of 'meaningful learning'; that is, the relating of some new ideas in some 'sensible' fashion to established ideas already present in the learner's cognitive structure" (Lawton & Wanska, 1977). The theory emphasizes the need to provide the learner first with general ideas which become the "anchorage" for new ideas subsequently learned. Thus the new ideas are sequentially dependent on the previously learned general ideas.

Ausubel contends that discovery learning has certain psychological and educational limitations. For example, he states that not all individuals happen to function well at discovery learning. He also points out that such an approach to learning is very time consuming, and when used to effect, may only result in the same knowledge that could have been gained by more direct learning procedures. Ausubel has stated that "during these years (from about three to ten years) the act of discovery is not

indispensable for intuitive understanding, and need not constitute a routine part of pedagogic technique" (Ausubel, 1964, p. 292).

Instead, Ausubel strongly espouses an expository teaching/reception learning methodology. Intending to foster meaningful learning, this method requires that a greater proportion of the child's time will be spent in reception learning, and large part of the teacher's time in expository teaching.

An important condition under which the child's cognitive structure variables may operate is that learning tasks be sequentially organized in a related series. A positive transfer from one unit to the next is facilitated by units which are organized by meaningful association.

> In order to insure relevant 'anchoring ideas' for each subsequent unit of new learning, it is proposed that it is pedagogically sound to provide short statements called, by Ausubel, 'organizers,' which either activate existing ideas as subsumers, introduce new, higher-order concepts or ideas to serve this purpose, or more commonly do both these things. (Lawton & Wanska, 1976, p. 12)

The University of Wisconsin Ausubelian preschool operates four mornings a week. The daily schedule is broken down as follows:

| | |
|---|---|
| 8:15 - 8:30 a.m. | Children arrive |
| 8:30 - 8:45 | Together time |
| 8:45 - 10:15 | First advance organizer (small group) and related activities/free choice |
| 10:15 - 10:30 | Snack |
| 10:30 - 10:50 | Recess |
| 10:50 - 11:30 | Second advance organizer (large group) and related activities |
| 11:3[illegible] | Dismissal |

The schedule is flexible with regard to the time spent in each period of the day, depending on the subject-matter being covered and the activi-

ties that are planned.

The first advance organizer is presented to a small group, and lasts anywhere from 5 to 15 minutes. The lesson may take two forms. The first type "presents high level concepts of a subject-matter area, while the second type presents the high-order rules and strategies that are intended to assist the use of logical operations" (Lawton, Lewis, & Deibert, 1976, p. 68). Each lesson is then followed by a time period where the children are free to work with related activities and materials and where the initiative for learning is more in their hands. The teachers may use the related activity periods for formative evaluation. "Opportunities arise for child to teach child, for group interaction (with social skills being introduced in both situations), or for individually guided learning by a teacher" (Lawton, Lewis, & Deibert, 1976, p. 69). Thus, expository teaching is one element of the teaching role. During related learning activities the teacher operates in much the same way as that advocated by Piagetian educators (e.g., Kamii & DeVries, 1978).

## Ausubelian Program Objectives

A primary assumption central to Ausubel's theory of meaning and meaningful learning is that "the most important factor influencing learning is the quantity, clarity, and organization of the learner's present knowledge" (Ausubel, 1969, p. 51). This present knowledge consists of the facts, concepts, propositions, theories, and raw perceptual data from subject matter that the learner has available in cognitive structure. The most important type of knowledge in cognitive structure is stated as being structures of related general ideas. When meaningful learning occurs, new ideas are related in some sensible fashion to previously established

general ideas. This process is called progressive differentiation. It is expected that such knowledge has greater memorial tangevity and potential for use in further meaningful learning.

A number of objectives for the Ausubelian preschool program have been identified by Lawton et al. They suggested that first it was desirable to establish:

1. A set of empirically or logically derived relationships between factors in the preschool situation and desired outcomes measured in terms of young children's behaviors (especially cognitive);

2. A meaningful reception/discovery learning dimension in connection with subject-matter and process concepts and propositions;

3. Concept formation and concept assimilation processes characteristic of the young child's early learning and elementary strategies for the application of logical operations and problem-solving activities;

4. Hierarchical structures of ideas within both subject matter and intellectual skill domains;

5. An expository teaching/reception learning pedagogy consisting of an interrelated sequential system of advance organizer lessons and related activities aimed at promoting meaningful subsumption learning;

6. A learning/retention/practice transfer model of learning constructed in accord with integrated sequences of events;

7. A measure of the nature and degree of accelerated learning and its effects within the context of "stage theory";

8. The essential role of implicit meaning in language use, a comparison of the cognitive advantages and demands of temporal and abstract concepts, and a measure of the learning of complex linguistic concepts.

Second, consideration must then be given to the application of instruction and learning. The basic goals for the Ausubelian preschool classroom are concerned with cognitive, psycho-motor, and socio-emo- development. Both subject-matter and process skills are taught hand in hand, with the intention being to enhance both physical, social, and logi cal knowledge and an intuitive understanding of their interdependence.

It is expected that logical operations (as described by Piaget) can be taught as high-order rules generalizable to classes of related problems. This is accomplished during advance organizer lessons where the teaching is mainly expository and learning receptive. It is expected that the teacher's verbalizations will be mainly in the form of direct questions and statements, with the emphasis on content concepts, process concepts, or a combination of both. However, it is important to emphasize that all concepts and propositions introduced during advance organizer lessons and further attended to during related learning activities, must be adequately exemplified by concrete learning materials.

In the related learning activities, there is expected to be a larger proportion of indirect verbalizations. Because the role of the teacher should now be more indirect and the activity of the child more direct, it is expected that teacher verbalizations will be more in the form of indirect questions and statements with more emphasis on encouraging the identification of previously learned general ideas and related particular concepts and factual information children come in contact with at this time. The teacher will be trying to facilitate a progressive differentiation of superordinate to subordinate concepts and factual information during the related activity sessions.

## The Study

The present study is an investigation of the relationships between the aims and teaching methods of both a formal and informal preschool program, and types of verbal utterances used in small group instructional time and subsequent learning activities. With reference to the theoretical bases of the two programs, certain types of verbal utterances by teacher and child can be predicted.

It is expected that types of utterances by teachers in the Piagetian program would be predominantly open-ended questions, open-ended statements, statements more concerned with process than content, and verbal instructions encouraging divergent thinking. In the case of the Ausubelian program, verbal utterances by teachers might be expected to differ to some extent from those in the Piagetian program. It is expected that in the advance organizer lessons the teacher is likely to use more direct questions and statements, more statements concerned with content, more statements concerned with the relationship between content and process, and more statements concerned with convergent, rather than divergent thinking. However, in the related learning activities, there is expected to be a larger proportion of indirect questions and statements.

The main objectives of this investigation are listed as follows:

1. To establish an estimate of the theoretical and pedagogical principles underlining the two programs by use of a questionnaire administered to teachers.

2. To record the type and frequency of teacher and child utterances (using videotape).

3. To compare teacher and child types of utterances and frequency

of use within each program, for small group and subsequent learning activities.

4. To compare types and frequencies of teacher-child verbalizations between both programs in small group and subsequent learning activities.

5. To estimate content validity of types of teacher utterances by reference to teacher-selected theoretical and pedagogical principles as identified in responses to the questionnaire.

A number of questions follow from these objectives:

1. Will teachers in both programs select theoretical and pedagogical principles that directly relate to an Ausubelian and Piagetian program, respectively?

2. Will the type and frequency of (a) teacher, and (b) child verbalizations differ within and between both programs?

3. Will the type and frequency of teacher compared to child verbalizations differ within and between both programs?

4. Will the type and frequency of (a) teacher, and (b) child verbalizations within and between programs be different during small group instruction compared to subsequent learning activities?

5, Will the type and frequency of teacher-child verbalizations be congruent with stated teacher theoretical and pedagogical principles and associated teacher/child roles for both programs, respectively?

## II

## RELATED LITERATURE

At issue today, still, is how individuals acquire knowledge presented orally or graphically. In Western societies information is transmitted through oral and written language, pictures and other sign systems, all of which involve the understanding that experiences and thoughts can be represented in various forms.

Studies specifically investigating teacher-child communication patterns, verbal interaction, and verbal behavior are few in number. Most of the communication research is of limited relevance to this study. To begin with, in most studies subjects were typically from elementary or secondary education. For this reason the studies were not concerned with how particular language patterns were evolving.

Much of the research on child language has failed to take account of advances in linguistic studies. Likewise, linguists studying child language have missed many opportunities for interpreting their observations in psychological terms. With regard to research methodologies, Carroll (1960) cites the most extensive and careful studies to be those of the linguists Cohen (1952), Grégoire (1947), and Velten (1943). Carroll espouses that "only from such studies can come the kind of data needed to establish precise scales of language development" (1960, p. 203).

Several investigators have provided normative data simply to meet a need for a simple way of gauging children's stages of development. Indices

were used such as amount and rate of talking, mean sentence length, and percentage of compound and complex sentences. For example, Miller and Dollard (1941) proposed experiments dealing with the babbling stage. Kaczmarek (1953) reports in careful detail about the language learning of a few children in one Polish family; and so on. Other investigation and education have focused on the relationship between types of verbalization used, the content of these verbalizations, and their possible affect on cognitive development. For example, Sigel and Cocking (1977) ask the question, does the mode of transmission of information place a particular cognitive demand on the developing system?

An investigation which is more related to identifying types of linguistic utterances and their relationships to both language and cognitive development is that by Mosher and Hornsby (1966). Their study was concerned with seeking of information and its usage. They propose that information-seeking reflects the way we organize our thoughts. What we ask, and how we use answers depends upon how our knowledge is organized. Therefore, children of different ages can be expected to undergo drastic changes in the way they ask questions and organize answers. They attempted to measure cognitive growth as it is reflected in information-seeking. They found that the development of strategies for seeking information is "toward increasingly connected acts designed to locate relevance by more economical but less direct means" (1966, p. 96). They claim that this growth parallels the development of means for establishing equivalence for superordinate categories, but lags slightly behind that development. With development, the child builds a more constrained strategy for using information.

> He is increasingly able to guide his inquiries by what he has found out earlier and to eliminate possibilities by ruling out whole classes of objects or events. In part, this growth of strategies in the use of information is based on the structure provided by the achievement of super-ordinate-equivalence categories. For, as the child increasingly relies on symbolic representation rather than on representation by action and image--and thus is able to construct groupings of objects and events on the basis of characteristics they have in common--he attains the structure of information necessary to follow through a constraint-seeking strategy, to guide his inquiry by cycles of questioning that narrow from the general to the specific. In contrast, the child relying on enactive and ikonic representation with the consequent complexive nature of his equivalence groupings lacks the prerequisite structure for such a constraint approach, and thus can do little more than use hypothesis scanning in seeking new information. (p. 101)

An important conclusion that can be drawn from this research is that language strategies that facilitated both language use and concept learning tended to be direct and highly structured.

Kearsley (1976) addressed the linguistic, psychological, and social aspects of questions and question asking. He outlined classification taxonomies for question forms and functions. His study includes descriptive data for the occurrence of question types in verbal discourse. Kearsley subdivides verbal questions into direct and indirect questions. Indirect questions are defined as "declaratives which contain an embedded partial interrogative phrase; e.g., 'I wonder where the house is' or 'It isn't obvious what you mean'" (p. 358). He does not consider these to be "true" questions in the syntactic sense, "yet they still serve the essential purpose of a question," which in Kearsley's mind is to elicit a response from the addressee. Direct questions do have a question mark when in written form, and which intonation patterns would reflect in verbal discourse.

He then subdivides direct questions into (a) open ("fill-in-the-blank

or lexical gap") questions, and (b) closed ("disjunctive or whether") questions. "The answer to an open question belongs to an essentially infinite set of possibilities not specified in the question." "The answer to a closed-form question is from a fixed alternative either explicitly or implicitly contained in the question."

Kearsley also subtypes closed-form questions: "specified alternatives" which provide the alternatives which are acceptable as an answer (e.g., "Do you want coffee, tea, or hot chocolate?") and "yes/no" questions which require confirmation or denial of the assertion of the question (e.g., "Is that dog dead?") (1976, p. 359).

Kearsley's taxonomy of question forms poses the question of how these different forms are generated and what different purposes they serve. He considers how "the present situation or cognitive context determines exactly what is to be asked about and what expressive mode (if any) is to be used" (p. 364). As explained above, it also involves the basic choice between asking an open- or closed-form question. This aspect of question process he considers to fall within the domains of cognitive psychology and psycholinguistics, citing Berlyne (1960, 1965) as one of the few psychologists to have worked intensively in the area. Berlyne postulates that questions arise due to conceptual conflict and serve the purpose of reducing that conflict and uncertainty. However, neither Berlyne nor other theorists sharing similar theories of cognitive consistency, attitude formation, and change in social psychology, tell us how <u>particular</u> questions are selected. Rather, they suggest how questions arise in <u>general</u>.

Kearsley proposes that question asking:

> involves filling in the 'gaps' in a cognitive model, where a cognitive model is defined as that subportion of an individual's entire conceptual structure which currently conveys the meaning of events or objects in the immediate environment. Filling in the 'gaps' involves specifying the concepts and relations in six basic reference frames: space, time, properties, causes, procedures, and roles (Kearsley, 1976, p. 364).

Kearsley's theory is concerned with the prediction of the content and form of questions, given the details of the environment, and context, and the particular individual's conceptual structure. However, for the actual syntax of question formation, he refers his readers to research done by linguists and psycholinguists.

It seems evident that both question processes and associated verbal statements entail complex behavior. The study of questions and question asking and communication patterns in general should be of great interest to those involved with representation and reorganization of knowledge. Verbal utterances and interaction could provide insight to how an individual is thinking, acquiring, and organizing new knowledge. Verbal behavior can reflect the individual's conceptual structure. Educators would do well to concern themselves with such information. One important question worth asking is, under what conditions can they expect their children to deal with various questions and statements?

Kamii and DeVries (1977) identify certain types of questions which, in their opinion, a teacher should ask if he or she were teaching in a Piagetian-based program where the children are encouraged to think, to notice the results of their actions, to solve problems, and to explore a variety of solutions. Teachers engage in conversations with the children in which children's statements and opinions are accepted and respected; suggestions

such as "I wonder if this will stick, too," are offered; questions that require no specific answer but stimulate thought, such as "Did you see the balloon blow up when the soda was added?" are asked; and alternative conclusions or solutions are acknowledged.

Although Ausubel agrees that the young child has problems dealing with general questions, he maintains that children have a childish understanding about generalizing. He claims that teachers can teach children to become more efficient at generalizing by asking appropriate questions in the context of meaningful learning.

Research has barely begun to address the question regarding how methodologies might affect the development of different learning processes and the potential for knowledge and skill acquisition. Research regarding styles of communication and verbal response must consider the importance of the conditions under which verbal responses are elicited. It has been repeatedly demonstrated (Hahn, 1948; Jacobson, 1968) that different frequencies of responses depend on the situation: free play, supervised play, play inside or outdoors, conversation with adults, or the like. Careful time sampling and situation sampling designs seem to be in order if one wants purely normative or 'typical' data; even the 'classic' studies have shortcomings in this respect.

There is limited available research that is not based mainly on observations in naturalistic settings. Few have been concerned with learning processes in educational settings, probably because until recently researchers never seemed to think of "teaching" a child his language, nor of investigating the effects of specific teaching practices on language development.

While researchers can identify, from their own point of view, certain

types of questions and statements, they cannot properly evaluate the pragmatic form of the utterance until the person being spoken to reacts. How the receiver of a question answers reflects the way in which the initial utterance was interpreted. However, it is apparent that most teachers of young children frequently use four basic types of utterances: direct and indirect questions and statements. The terms direct and indirect are intended to correspond to the terms open- and closed-form as used by Kearsley. In the absence of any alternate verbal statement typography that might prove appropriate to use in an analysis of teacher and child utterances in instructional settings, it was decided to use these four basic types in this investigation. No studies have been found which clearly link type of utterance to either content or information processing areas. Nor have there been located studies which have investigated relationships between type of utterance and the management of instruction and learning. Therefore, the categories of utterances identified in the two matrices (language use and task management)[1] in this present study have been collected from literature on developmental and instructional theory.

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[1] See Design and Methods, Figures 1 and 2.

# III

# DESIGN AND METHOD

## Method

### Subjects

It had been estimated that about eight tapes could be feasibly made of each type of learning activity, taking into account (a) opportunity for videotaping in the classroom, (b) time required to tape and code, and c) using the same subject more than once. Under these conditions it was estimated that eight children in each program could be consistently followed through both types of learning activity. Thus, a total of 16 subjects were selected by an opportunity sampling procedure from the total number of children in both preschool programs. The children at the University of Wisconsin preschool laboratory were initially chosen at random from all applicants, and were assigned to either the Ausubelian or Piagetian program so that they were comparable by age and verbal reasoning score. It was estimated that the eight selected were not significantly different from the total group according to these criteria.

Distribution of the sample by age and verbal reasoning score is presented in Table 1. Three teachers and eight children were videotaped during small group and subsequent learning activity sessions in both programs.

### Taping Sessions

This study was designed to measure certain types of verbal utterances. Thirty-two videotapes were made in order to record teacher and child ver-

Table 1

Sample Mean Age and Mean Verbal Reasoning Score by Type of Program

| Program | Mean age (months) | Range (months) | Mean verbal reasoning score | SD |
|---|---|---|---|---|
| Piagetian | 54 | 41-63 | 112 | 5.8 |
| Ausubelian | 61 | 49-73 | 114 | 6.3 |

balizations. Within each program, half of the tapes were made during eight small group instruction sessions. The other half of the tapes were made during eight subsequent learning activity sessions. In the case of the Ausubelian program, these latter tapes were made during related activities, and for the Piagetian program at times when children were freely choosing to work at various activity centers around the room.

The videotapes were made in order to obtain and record empirical evidence concerning teacher and child verbal utterances. The tapes were coded and then used as a basis for comparison of the two preschool programs and to provide an estimate of content validity in relation to the selection of theoretical and pedagogic principles applied to each program. Taping was done at two different times during the day, since various time periods and activity sessions called for different types of verbal behavior.

Each videotaping session lasted approximately 10 minutes. During small group sessions the total group and teacher could be easily videotaped since they were in a static situation. During the related activity time, children had to be videotaped with a teacher in one-to-one situations or in small groups of children as they moved about the room.

Types of Learning Activity

The organization of learning during small group and related activity sessions differs between programs. In the Piagetian classroom, for small group sessions, the children are divided into four small groups of about four or five children per group. Four small group activity sessions are set up for 1 entire week. The groups of children rotated through each small group activity so that by the end of the week each child has participated in each one. "While each small group activity has its own objec-

tives, the overall rationale for including small group time is to insure the social interaction of every child" (Ershler et al., 1977, p. 69). The Piagetian teachers arrange the physical environment by placing a choice of materials easily accessible to the children and conducive to working in small groups. The activities in the small group sessions are also intended to encourage the children to become actively engaged in working toward a particular goal. The teacher aims to facilitate child-materials interactions in a nonevaluative manner (e.g., "Did you see what John did to his design?" rather than "John made the best design! Did you all see it?"). The teacher, then, is actively involved, not as a director or demonstrator, but as a coworker with the children. The intention is to encourage problem solving and stimulate thought by offering suggestions and questions that require no specific answer.

Another major learning time period in the Piagetian program is free rotation. During this period the children are free to select learning materials organized in the various "activity centers" around the room. Teachers interact with the children at this time according to arbitrary decisions to do so, or if invited. The type of materials selected by the child, what to do with them, and for how long is also dependent upon arbitrary decision.

In the Ausubelian classroom the children are divided into four groups of about four or five children per group. Each small group session is in the form of an advance organizer lesson, which can be of three types: either an advance organizer dealing with content concepts or one dealing with process concepts, or a combination of both. These lessons are taught in an expository fashion. The first type presents high-level content con-

cepts from a subject matter area. The second type presents high-order rules that are intended to assist the use of logical operations, (e.g., classification, relations, conservation). For the third type of lesson, the teacher attempts to direct the child to an understanding of important relations between the structure of content and that of process. During each type of advance organizer concrete props are provided to exemplify concepts and propositions.

Each advance organizer lesson is followed immediately by a time period during which children are engaged in activities using more particular learning materials which are meaningfully associated with the prior learned general ideas. Related learning activities may involve small groups or may be organized on an individual basis. Opportunities may arise for children to teach each other, for group interaction, or individual guided learning by a teacher. The children are guided to each of a number of related activity areas, with the teacher insuring each child spends some time in each area. The child is encouraged to be self-directive. For some children, direction of learning may rest almost entirely with the teacher. Some children acquire greater autonomy over a period of time. These related learning activity sessions are also used by teachers as a time for formative evaluation.

Coding Systems

Two coding systems were established for categorizing verbal interaction and task management. The verbal interaction coding system was designed to classify types of teacher and child utterances. Four basic forms of utterances used by teachers and children are direct/indirect questions and statements. For each type, a number of categories of utterances can also

be identified: utterances referring to subject matter (content), to process (logical reasoning), to a relationship between content and process, to general ideas (superordinate concepts), to specific information (subordinate concepts and factual information), to divergent and convergent thinking. A matrix can be constructed for identifying the interrelationship of form and type and for categorizing utterances. This matrix is presented in Figure 1.

Further categories of utterances associated with task management were also identified: statements of command, suggestions and autonomous statements; structured; direct and indirect; and qualified statements. These could also be related to the basic forms of statements in a matrix similar to the one for verbal interactions. This matrix is presented in Figure 2.

Identification of Type and Category

The first step in coding utterances was to determine whether the utterance was either a statement or question, and furthermore, whether it was direct or indirect (i.e., identify type of utterance). Direct type (closed-form) of utterances (DS or DQ) are those which center around one distinct thought; i.e., they focus in on a single concept. The answer to a direct question is from a fixed alternative either explicitly or implicitly contained in the question; e.g., yes/no, a color name, or a number. Indirect (open-form) utterances would require no specific response or answer, but are intended to stimulate thought. The answer to an indirect question (open question) is not offered in the question. Instead, it comes from an infinite set of possibilities. It was expected on the basis of theory that the Piagetian teachers would tend to be more

Figure 1

Matrix of Type and Category of Verbal Utterances

| Type/category | C | P | C/P | S | G | CT | DT |
|---|---|---|---|---|---|---|---|
| DS | | | | | | | |
| IS | | | | | | | |
| DQ | | | | | | | |
| IQ | | | | | | | |

Type: DS = Direct statement, IS = Indirect statement, DQ = Direct question, IQ = Indirect question.

Category: C = Content, P = Process, C/P = Content and process, G = General, S = specific, DT = Divergent thinking, CT = Convergent thinking.

Figure 2

Matrix of Type and Category of Verbal Utterances

Related to Task Management

| Type/cagetory | C | S | A | ST | D | I | Q |
|---|---|---|---|---|---|---|---|
| DS | | | | | | | |
| IS | | | | | | | |
| DQ | | | | | | | |
| IQ | | | | | | | |

Type: DS = Direct statement, IS = Indirect statement, DQ = Direct question, IQ = Indirect question.

Category: C = Command, S = Suggestion, A = Autonomous, ST = Structured thoughts/instructions, D = Direct, I = Indirect, Q = Qualified.

indirect overall than the Ausubelians.

Examples of each type of utterance, as identified in Figure 1, are as follows:

DS: "This is a bird. It is an animal."

DQ: "Do animals need to have food? How many legs does the animal have?"

IS: "I wonder what this is for."

IQ: "What could be inside?"

These are definitions of face value statements. In practice or during coding, the context in which utterances occurred and the reaction of the recipient sometimes changed the type.

The second step was to identify each type of utterance by category. The categorization of each utterance depended on the observation of two related factors; one was the direct identification of the utterance made by the speaker; the second was how an utterance was received by the listener. For example, the utterance, "This is an animal" can be immediately identified as a statement about content. But that is all, taken at face value. Whether it can also be typified as direct/indirect, or categorized as general/specific, or promoting divergent/convergent thinking will be dependent upon how it is received and reacted to by the child, and also in part, on the content of the learning situation, learning materials, intention of the speaker, and sequence of verbalizations in which it occurs. In practice, it is unlikely that all these interrelated factors and subfactors can be accounted for. But as many as possible should be. Videotaped data makes such coding possible. So each utterance was coded on the basis of observed interactions between speaker, listener, and context.

The first category, content, accounts for physical and social knowledge young children will be likely to acquire (i.e., subject matter). Types of utterances that fall into the process category would make reference to classification, sequencing, seriation, transitivity, and conservation. Some utterances made reference to both process and content concepts. Examples of utterances referring to content and process and both combined are as follows:

C: "All living things can move by themselves."

P: "You need to make a group of things which are the same in one way."

P/C: "Your animal has to belong to the mammal group of animals because it is a mammal."

The fourth and fifth categories included utterances which referred to general concepts or propositions, or to specific concepts or facts. For example:

G: "These are animals and plants. They are all living things. All living things need food and water."

S: "The dog is a living thing because he needs food and water."

Utterances in the sixth and seventh categories referred to either divergent or convergent thinking. These utterances can be identified in terms of their open-endedness (divergent) vs. their close-endedness (convergent).

For example:

D: "Maybe it will look like that. Let's find out."

C: Pointing outside the classroom window where flowers can be seen amongst other plants and inanimate objects, the teacher asks, "Are there any flowers outside now?" The child is very likely to answer "yes."

Questionnaire

A questionnaire was constructed consisting of 48 items. Material for the questionnaire items was selected from literature written by or about Piaget and Ausubel and their prescribed or inferred teaching methodologies and pedagogical principles. With respect to Piagetian teaching methodology, the sources for this later type of information were mostly secondary; for example, Kamii and DeVries (1977, 1978), Furth (1969), and Elkind (1976). The intent of the questionnaire was to collect information regarding the teachers' selection of theoretical and pedagogic statements and principles referring to teacher role, pupil role, classroom organization, behavioral objectives, curriculum content, and teaching methodologies in informal and formal preschool programs.

Questionnaire statements were written that could be associated with a Piagetian and Ausubelian preschool program, and a number of statements that were considered neutral. These statements might be considered applicable to one of the programs, to both programs, or neither.

The questionnaire was piloted to exclude ambiguous statements, to exclude misleading statements, to complete an item analysis of three types of Piagetian, Ausubelian, and neutral statements, and to establish the reliability of the questionnaire.

For the pilot evaluation of questionnaire items, individuals who were considered experts in both theories were asked to complete the form. Each questionnaire item was then evaluated on the basis of responses from these judges. At this time, some items were reworded or rephrased, and three items were excluded as being totally inadequate. A final form of the questionnaire contained 15 items for each of Piagetian, Ausubelian, and neutral categories (see Appendix A).

## Procedure

### Administration of the Questionnaire

The questionnaire was anonymously completed by the regular and student teachers in both preschool programs (five Piagetian and four Ausubelian) before the commencement of the videotaping schedule.

### Videotaping

Videotaping was conducted during the months of February through May of 1977. The camera was set up in a suitable position within the classroom. Before the actual taping sessions occurred, the camera and equipment had been introduced to each classroom for children to inspect and become accustomed to. Figure 3 presents the videotaping schedule.

Each taping session lasted about 10 minutes. No problems were encountered in completing taping. All tapes provided a clear reproduction of vision and sound, so no wastage occurred. At completion of the videotaping, each utterance was coded.

### Coding of Verbal Utterances

Each utterance was coded first according to the 28 possible types of category cells, and second, according to the 28 task management categories.

Initial coding of the tapes was done by the second investigator. Twenty-five percent of the tapes were coded subsequently by two other coders who had been instructed in the use of the coding system and procedure. The following correlation coefficients were obtained as estimates of intercoder reliability using the Kuder Richardson 20 formula:

| | |
|---|---|
| Coders 1 and 2 | $r = .81$ |
| Coders 1 and 3 | $r = .89$ |
| Coders 2 and 3 | $r = .84$ |

Figure 3

Videotaping Schedule

| Tape # | Ausubelian | Tape # | Piagetian |
|---|---|---|---|
| 1 | February 1, 1977 | 1 | March 1, 1977 |
| | AO 9 min. 0 sec. | | SG 10 min. 0 sec. |
| | RA 9 min. 20 sec. | | RA 9 min. 30 sec. |
| 2 | February 3, 1977 | 2 | February 3, 1977 |
| | AO 9 min. 40 sec. | | SG 8 min. 40 sec. |
| | RA 11 min. 50 sec. | | RA 6 min. 30 sec. |
| 3 | March 10, 1977 | 3 | February 15, 1977 |
| | AO 9 min. 10 sec. | | SG 9 min. 30 sec. |
| | RA 6 min. 20 sec. | | RA 8 min. 0 sec. |
| 4 | February 23, 1977 | 4 | February 22, 1977 |
| | AO 10 min. 40 sec. | | SG 8 min. 40 sec. |
| | RA 5 min. 30 sec. | | RA 8 min. 50 sec. |
| 5 | April 19, 1977 | 5 | April 19, 1977 |
| | AO 13 min. 10 sec. | | SG 5 min. 30 sec. |
| | RA 8 min. 40 sec. | | RA 16 min. 10 sec. |
| 6 | April 21, 1977 | 6 | April 21, 1977 |
| | AO 13 min. 20 sec. | | SG 4 min. 10 sec. |
| | RA 6 min. 40 sec. | | RA 8 min. 0 sec. |
| 7 | April 26, 1977 | 7 | April 26, 1977 |
| | AO 9 min. 10 sec. | | SG 4 min. 10 sec. |
| | RA 8 min. 20 sec. | | RA 10 min. 10 sec. |
| 8 | May 3, 1977 | 8 | May 12, 1977 |
| | AO 9 min. 20 sec. | | SG 13 min. 10 sec. |
| | RA 6 min. 30 sec. | | RA 8 min. 40 sec. |

Note: AO = Advance organizer (small group), SG = Small group, and RA = Related learning activity period.

The number of utterances in each category was then converted to a percentage of total utterances by type and category.

Examples of the format of the coding sheets are provided in Appendix B.

# IV

## RESULTS

First the results of the questionnaires completed by the preschool teachers will be reported. A report on the results of the coded videotapes will then follow. In analyzing the data, two types of verbal utterances [Reminding statements (RS) and Reminding questions (RQ)] and six categories of types of utterances [Response to teacher (ET), Response to child (EC), Response to teacher and child (ETC), Response to another child (EAC), Response to teacher and another child (ETAC), and Figurative knowledge ($C_f$)] were excluded from the analysis. Utterances in these categories simply did not occur often enough to justify analysis.

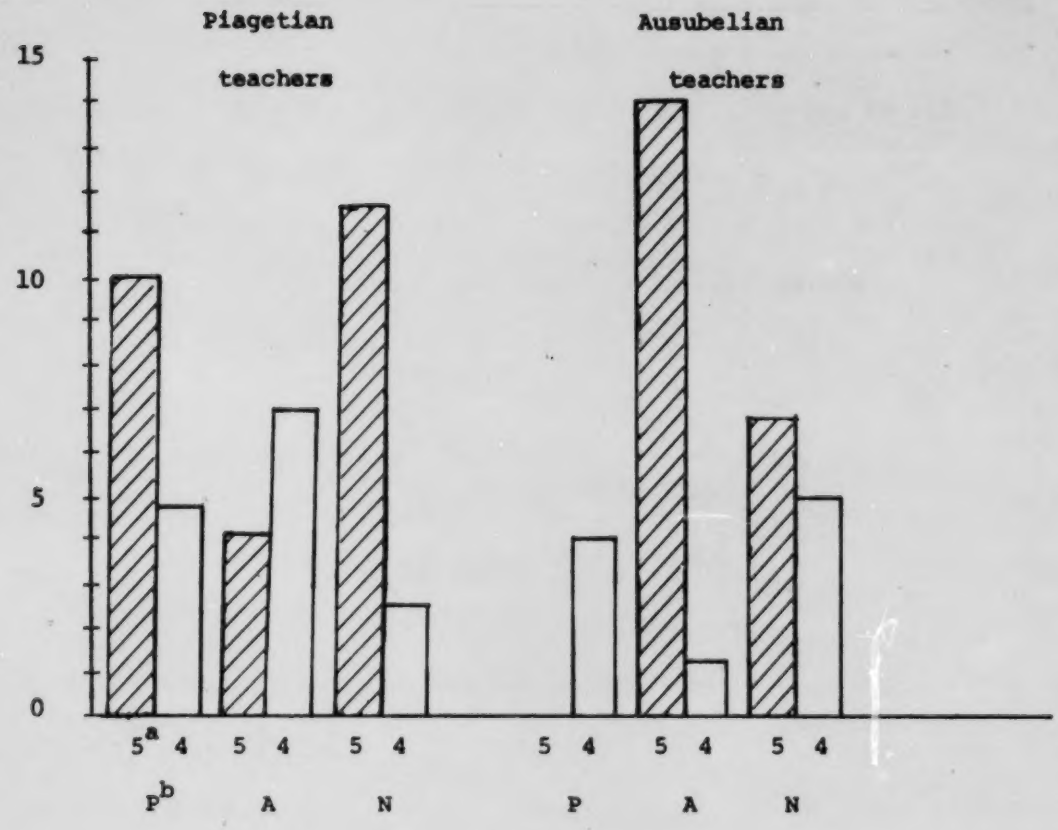
The results of the analysis of teacher and child utterances are set out in eight sections. The first four sections deal with teacher and child utterances in small group and related learning activities. The second four sections deal with teacher and child utterances related to task management behavior during small group and related learning activities.

For both groups of teachers a mean score was obtained for their responses to each item. Since there were no major differences in the way items were endorsed by each teacher in both groups, standard deviation scores were not computed. This pooled data were then categorized according to Piagetian, Ausubelian, or neutral items. The results are provided in Figure 4 for these items endorsed at points 4 (agree) and 5 (strongly agree) on the 5-point scale.

Figure 4

Distribution of Strongly Endorsed Items in Three Categories

by Two Groups of Teachers




[a] 5/4: Strongly agree/agree points on a 5-point scale.

[b] P = Piagetian items, A = Ausubelian items, and N = Neutral items

Ausubelian teachers strongly endorse 80% of Ausubelian items and Piagetian teachers 50% of items which apply to their program. Although both groups of teachers agree with almost all the neutral items, the emphasis of agreement is different. However, these items did appear to serve the role of a "control" category, making it more certain that a class differentiation had been made in constructing Piagetian and Ausubelian items.

## Questionnaire Results

Results from the questionnaire are presented in Table 2. Each item has a category label and two scores: the mean score for each program. The category labels (A, P, and N) indicate whether an item refers to an Ausubelian (formal) program, a Piagetian (informal) program, or is neutral. Neutral items may be considered equally applicable to each program.

## Videotape Results

### Small Group Verbalization

It can be seen in the results shown in Table 3[2] that considerably more statements, overall, were made by Ausubelian teachers compared to teachers in the Piagetian program (871 vs. 448). It is also quite clear that teachers in both programs almost always used direct types of utterances, rather than indirect. Also, teachers in both classrooms tended to make more direct statements than ask direct questions. Although the Piagetian teachers asked more indirect questions than the Ausubelian teachers (4.9% compared to 0.3%), only about 22 such questions were asked during 1½ hours of small group learning activities.

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[2]There are three groups (group 1: process, content, process/content; group 2: general, specific; group 3: divergent, convergent) of category of utterance. Total number of utterances by type were coded for each of the three groups separately. Therefore, percentages in each group total 100%.

Table 2

Responses of Teachers to Questionnaire

| Question number | Category* | Mean Ausubelian teacher score | Mean Piagetian teacher score | Question number | Category | Mean Ausubelian teacher score | Mean Piagetian teacher score |
|---|---|---|---|---|---|---|---|
| 1 | N | 4.0 | 2.0 | 24 | N | 4.0 | 5.0 |
| 2 | P | 2.2 | 4.0 | 25 | N | 4.2 | 4.8 |
| 3 | N | 4.5 | 4.8 | 26 | P | 2.2 | 4.8 |
| 4 | P | 1.8 | 4.6 | 27 | A | 5.0 | 2.8 |
| 5 | A | 4.2 | 4.0 | 28 | P | 1.2 | 1.2 |
| 6 | N | 5.0 | 4.6 | 29 | N | 3.7 | 4.5 |
| 7 | P | 3.5 | 4.6 | 30 | P | 1.2 | 1.6 |
| 8 | N | 4.5 | 4.6 | 31 | P | 3.2 | 4.8 |
| 9 | A | 5.0 | 4.0 | 32 | N | 3.5 | 4.2 |
| 10 | P | 2.0 | 4.0 | 33 | A | 4.8 | 3.8 |
| 11 | A | 4.8 | 4.6 | 34 | A | 4.8 | 3.2 |
| 12 | P | 1.2 | 4.0 | 35 | N | 4.0 | 4.6 |
| 13 | N | 3.5 | 4.6 | 36 | P | 2.0 | 2.8 |
| 14 | A | 5.0 | 2.6 | 37 | N | 4.5 | 4.6 |
| 15 | N | 3.5 | 3.6 | 38 | A | 2.5 | 4.0 |
| 16 | A | 4.2 | 4.6 | 39 | A | 4.8 | 3.6 |
| 17 | N | 3.7 | 3.0 | 40 | P | 1.0 | 3.6 |
| 18 | P | 3.5 | 2.4 | 41 | A | 3.7 | 3.2 |
| 19 | A | 4.8 | 3.2 | 42 | A | 4.5 | 3.2 |
| 20 | A | 4.8 | 3.6 | 43 | A | 4.8 | 4.2 |
| 21 | P | 1.2 | 4.6 | 44 | N | 2.8 | 2.6 |
| 22 | P | 3.5 | 4.0 | 45 | A | 4.8 | 2.4 |
| 23 | N | 3.5 | 4.6 | | | | |

*Note: A = Ausubelian, P = Piagetian, N = neutral.

Table 3

Percentages of Utterances by Type and Category used by Teachers During Small Group and Related Learning Activities

| Program | Type of utterance[a] | | | Categories of types of utterances[b] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Frequency | Percentage | P | C | P/C | G | S | DT | CT |
| Ausubel | DS | 562 (274)[c] | 64.5 (63.6) | 14.1 (2.6) | 69.2 (82.4) | 16.7 (15.0) | 8.9 (4.4) | 91.1 (95.6) | .9 (5.8) | 99.1 (94.2) |
| | IS | 0[d] (12) | 0 (2.8) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | DQ | 308 (119) | 35.4 (27.6) | 2.6 (1.7) | 84.1 (84.9) | 13.3 (13.4) | 4.6 (5.0) | 95.5 (95.0) | 3.9 (10.1) | 96.1 (89.9) |
| | IQ | 1 (26) | .3 (6.0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Piaget | DS | 229 (150) | 51.1 (46.3) | 0 (0) | 100.0 (100.0) | 0 (0) | 0 ( .7) | 100.0 (99.3) | 2.6 (7.3) | 97.4 (92.7) |
| | IS | 6 (2) | 1.3 ( .6) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | DQ | 191 (153) | 42.6 (47.2) | 0 (0) | 98.4 (100.0) | 1.6 (0) | 3.1 ( .6) | 96.9 (99.4) | 18.9 (11.1) | 81.2 (88.9) |
| | IQ | 22 (19) | 4.9 (5.9) | 0 (0) | 100.0 (0) | 0 (0) | 0 (0) | 100.0 (0) | 95.5 (0) | 4.6 (0) |

[a]Types of utterances: DS = Direct statement; IS = Indirect statement; DQ = Direct question; IQ = Indirect question.

[b]Categories of types of utterances: P = Process; C = Content; P/C = Process and content; G = General; S = Specific; DT = Divergent thinking; CT = Convergent thinking.

[c]Figures in parentheses are for related (subsequent) learning activities.

[d]When number of utterances falls below 10, no percentages by type or category are given.

Three separate observations are required of the categories of utterances in connection with: first, the process, content, and process/content group (P + C + P/C); second, the general and specific group (G + S); third, the divergent and convergent group (D + C). Since process is so important a factor in the process/content category, for purposes of overall analysis, it was decided to group percentages of utterances in this category and the process category.

For Ausubelian teachers, statements in each of the three groups are almost always direct. The indirect questions (IQ) type can be ignored since it accounts for only one statement. In the first group (P + C + P/C) a larger proportion of utterances refer to process (P + P/C) when statements are direct (30.8%) than when direct questions are asked (15.9%). An average of 24% of utterances refer to process and 76% to content. Utterances by Piagetian teachers, whatever the type, always refer to content except for three direct questions which referred to process/content. In the second group, the preponderance of utterances by Ausubelian teachers referred to particular content (subordinate concepts, propositions, and factual information). This was also true for Piagetian teachers. Finally, it is quite clear that the Ausubelian teachers predominantly used utterances encouraging convergent thinking whereas such utterances by Piagetian teachers accounted for 64% of all utterances. Just over a third of utterances by these teachers encouraged children to engage in divergent thinking.

The results in Table 4 make it quite clear that the children in both programs tended to use direct types of utterances during small group learning activities. A large proportion of these utterances were DS rather than DQ. Almost all of the children's verbalization dealt with content in

Table 4

Percentages of Utterances by Type and Category Used by Children During Small Group and Related Learning Activities

| Program | Types of utterance[a] | | | Categories of types of utterances[b] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Frequency of use | Percentage | P | C | P/C | G | S | DT | CT |
| Ausubel | DS | 225 (213)[c] | 91.83 (79.5) | .4 ( .5) | 87.6 (83.1) | 12.0 (16.4) | 1.3 | 98.7 | 0 | 100.0 |
| | IS | 3 (30) | 1.23 (11.2) | 0 (0) | 0 (60.0) | 0 (40.0) | 0 (0) | 0 (100.0) | 0 (0) | 0 (100.0) |
| | DQ | 17 (22) | 6.94 (8.2) | 0 (4.5) | 100.0 (68.2) | 0 (27.3) | 0 (0) | 100.0 (100.0) | 0 (0) | 100.0 (100.0) |
| | IQ | 0[d] (3) | 0 (1.1) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Piaget | DS | 156 (210) | 93.41 (78.7) | 0 (0) | 100.0 (100.0) | 0 (0) | 0 ( .5) | 100.0 (99.5) | 0 (1.9) | 100.0 (98.1) |
| | IS | 0 (8) | 0 (3.0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | DQ | 11 (48) | 6.59 (18.0) | 0 (0) | 100.0 (100.0) | 0 (0) | 0 (0) | 100.0 (100.0) | 18.2 (18.8) | 81.8 (81.2) |
| | IQ | 0 (1) | 0 ( .3) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |

[a]Types of utterances: DS = Direct statement; IS = Indirect statement; DQ = Direct question; IQ = Indirect question.

[b]Categories of types of utterances: P = Process; C = Content; P/C = Process and content; G = General; S = Specific; DT = Divergent thinking; CT = Convergent thinking.

[c]Figures in parentheses are for related (subsequent) learning activities.

[d]When number of utterances falls below 10, no percentages by type or category are given.

the P + C + P/C group, except in the case of the Ausubelian program where 12% of direct statements referred to process. In the G + S group, all children's utterances referred to specific content. In the third group, it can be seen that almost all children's utterances were related to convergent, rather than divergent thinking. In the case of the Piagetian group, 18% of direct question type utterances were related to divergent thinking. However, this accounts for only 11 out of 167 utterances.

Related Learning Activity[3] Verbalization

First, in Table 3 it is clear, in view of the types of utterances used by teachers in both programs during the related learning activity period, that direct statements and questions far outnumbered indirect types. The distribution of utterances by type is similar to that for small group learning activities. Direct utterances were more often statements than questions, while the reverse was true for indirect utterances.

With regard to the categories of types of utterances, those used by the Ausubelian teachers were more widely distributed across the categories than was the case for the Piagetians. Piagetian teachers in the case of the first category group (P + C + P/C) used utterances which referred only to content (100%) in comparison to the Ausubelian teachers (83% content and 17% process).

With reference to the second category group (G + S), it is clear that the Piagetian and Ausubelian teachers almost always referred to specific information.

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[3]The term "related learning activity" is more applicable to the Ausubelian program since these are related to information in the advance organizer (small group) learning activities. For the Piagetian group, read "subsequent learning activities" (i.e., free rotation, activity center).

Finally, the majority of the direct statements and questions tended to encourage convergent rather than divergent thinking. With respect to the relatively small number of indirect utterances (mostly IQ) used by Piagetian teachers (Ausubelian teachers can be excluded), these were used mainly to encourage divergent thinking.

Second, it can be seen in Table 4 that the number of utterances spoken by children in the Ausubelian and Piagetian classrooms during the related activities periods were almost exactly equal (268 and 267, respectively). In each program the proportions of utterances which were direct statements were also very similar (79.48 and 78.65). A third similarity between children's utterances can be seen in comparing the proportions of indirect questions (1.12 and .38, respectively); both are very low. The remainder of utterances spoken by the Ausubelian children were more often indirect statements, and those by Piagetian children direct questions.

With respect to the distribution of utterances by category, it is apparent that: (a) Children in the Piagetian program always referred to content. Ausubelian children's utterances referred to content and process in proportion--68.2% to 31.8%. (b) All children spoke most frequently about specific concepts and factual information, and most utterances were made in connection with convergent thinking processes. Nine of the 48 direct questions (DQ) asked by Piagetian children were connected with a divergent thinking process.

Task Management During Small Group

Data in Table 5 indicate that the teachers of the Ausubelian and Piagetian programs made approximately the same number of task management utterances (144 and 127, respectively). These utterances were mainly direct; exclusively so in the case of Ausubelian teachers. Direct state-

Table 5

Percentages of Utterances by Type and Category of Task Management Used by Teachers During Small Group and Related Learning Activities

| Program | Type of utterance[a] | | | Categories of types of task management utterances[b] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Frequency of use | Percentage | C | S | A | ST | D | I | Q |
| Ausubel | DS | 126 (117)[c] | 87.5 (84.4) | 43.7 (37.6) | 56.3 (62.4) | 0 (0) | 21.4 (28.2) | 96.0 (85.5) | 4.0 (14.5) | 19.0 (17.1) |
| | IS | 0[d] (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | DQ | 18 (19) | 12.5 (14.1) | 5.6 (0) | 94.4 (79.0) | 0 (21.0) | 5.6 (0) | 94.4 (89.5) | 5.6 (10.5) | 5.6 (0) |
| | IQ | 0 (2) | 0 (1.5) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Piaget | DS | 84 (41) | 66.5 (64.1) | 66.7 (43.9) | 33.3 (56.1) | 0 (0) | 33.3 (9.8) | 94.1 (92.7) | 5.9 (7.3) | 8.3 (4.9) |
| | IS | 1 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | DQ | 39 (23) | 30.7 (35.9) | 0 (0) | 100.0 (100.0) | 0 (0) | 10.3 (26.1) | 84.6 (87.0) | 15.4 (13.0) | 0 (0) |
| | IQ | 3 (0) | 2.4 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |

[a] Types of utterances: DS = Direct statement; IS = Indirect statement; DQ = Direct question, IQ = Indirect question.

[b] Categories of types of utterances: C = Command; S = Suggestion; A = Autonomous; ST = Structured task management instructions; D = Direct; I = Indirect; Q = Qualification (i.e., gives reason for instructions).

[c] Figures in parentheses are for related (subsequent) learning activities.

[d] When number of utterances falls below 10, no percentages by type or category are given.

ments (DS) occurred more frequently than direct questions (DQ) in both programs.

In studying the categories of types of task management utterances, four separate observations are required in connection with: first, the command, suggestion and autonomous group (C + S + A); second, the percentage of task management utterances which were considered to be fairly precise in structuring the task management instructions (ST); third, the direct and indirect group (D + I); fourth, the percentage of utterances which are qualified--that is, the utterances include a reason for managing a task in a certain way (Q).

In the first group of categories, the Ausubelian teachers' direct utterances were fairly evenly divided between commands and suggestions, in comparison to their direct questions which were suggestions 95% of the time. The Piagetian teachers' direct statements were more often commands than suggestions (100%).

The percentages seen in the next category indicate that the Piagetian teachers' task management utterances included a greater amount of structure (told how to manage a given task) than was the case for the Ausubelian teachers.

The percentages seen in the third group of categories (D + I) indicate whether the task management utterances themselves (that is, the instructions for carrying out the task at hand) were considered to be direct or indirect. In considering the percentages seen in each of the categories, and the frequencies of each type of utterance to begin with, the trend in both programs was for the teachers to provide direct, rather than indirect task management utterances.

In the last category, the proportion of utterances which were qualified (Q) (that is, they provided a reason for carrying out the task) was greater for the Ausubelian teachers than for the Piagetian teachers. The Ausubelian teachers provided qualification for more than 24% of all their task management utterances (35/144 times). The Piagetian teachers provided qualification for more than 8% of their task management utterances (7/127 times). Therefore, it can be said that the Ausubelian teachers provided qualification for their task management utterances five times more than the Piagetian teachers.

With reference to data in Table 5, it is apparent that children in both the Ausubelian and Piagetian programs seldom used utterances oriented toward task management. Of the Ausubelian children's utterances, 6.12% related to task management; a proportion similar to the Piagetian children's utterances, which were 6.57% related to task management. Data in Tables 5 and 6 do give an idea of the types of task management utterances which were used, though sparinging so. For example, the children's utterances were primarily direct statements.

Percentages in the first category group in Table 5 (C + S + A) indicate that a greater proportion of utterances were commands rather than suggestions or autonomous speech. The percentages in the structured (ST) category are very low in both programs. The task management utterances in both programs were always direct (100%) rather than indirect, as can be seen in the third category group. In the last category (Q), the Ausubelian children provided slightly more qualification for their task management instructions than the Piagetian children who provided no qualification at all.

Table 6

Percentages of Utterances by Type and Category of Task Management Used by Children During Small Group and Related Learning Activities

| Program | Types of utterances[a] | | | Categories of types of task management utterances[b] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Frequency of use | Percentage | C | S | A | ST | D | I | Q |
| Ausubel | DS | 12 (27)[c] | 80.0 (64.3) | 50.0 (22.2) | 33.3 (44.5) | 16.7 (33.3) | 16.7 (18.5) | 100.0 (92.6) | 0 (7.4) | 8.3 (14.8) |
| | IS | 0[d] (8) | 0 (19.1) | 0 (12.5) | 0 (50.0) | 0 (37.5) | 0 (12.5) | 0 (62.5) | 0 (37.5) | 0 (0) |
| | DQ | 3 (4) | 20.0 (9.5) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | IQ | 0 (3) | 0 (7.1) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Piaget | DS | 11 (19) | 100.0 (86.4) | 72.7 (84.2) | 18.2 (5.3) | 9.1 (10.5) | 9.1 (0) | 100.0 (84.2) | 0 (15.8) | 0 (0) |
| | IS | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | DQ | 0 (3) | 0 (13.6) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| | IQ | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |

[a] Types of utterances: DS = Direct statement; IS = Indirect statement; DQ = Direct question; IQ = Indirect question.

[b] Categories of types of utterances: C = Command; S = Suggestion; A = Autonomous; ST = Structured task management instructions; D = Direct; I = Indirect; Q = Qualification (i.e., gives reason for instructions).

[c] Figures in parentheses are for related (subsequent) learning activities.

[d] When number of utterances falls below 10, no percentages by type or category of utterance have been given. In this case, due to low number of total utterances, percentages have been provided for the IS type.

Task Management During Related Learning Activities

During related learning activities, the Ausubelian teachers made more than twice as many task management utterances which were direct statements, than did the Piagetian teachers. All of the Piagetian, and almost all of the Ausubelian task management utterances were direct questions and statements, mostly the latter (see Table 5).

The distribution of utterances across categories was similar between and within programs. In the first category group, for both programs, the highest frequency did occur in the suggestion category. However, there was more variation between the C + S + A categories in the context of direct statements rather than when other types of utterances were used. This was also true for both programs.

The next category (ST) should also be considered in conjunction with the frequencies of each type of utterance. It appears that Ausubelian teachers provided more structure to their task management utterances than the Piagetian teachers during related learning activities.

Percentages in the third category group (D + I) make it clear that the majority of task management utterances are direct rather than indirect in both programs.

The percentages of qualification given to utterances used in task management is greater in the case of the Ausubelian teachers than for the Piagetian teachers. The Ausubelian teachers qualified 17% of their direct statements alone (approximately 20). The Piagetian teachers provided qualification approximately three times.

Children, generally, did not use many task management utterances. During small group learning activities, children in the Ausubelian program

made 15 such utterances, and in the Piagetian program, 11. During related learning activities, the figures were 42 and 22, respectively (see Table 6). In the latter case, the difference is interesting. The majority of utterances by both groups of children were direct statements. But the distributions of DS type utterances across categories were not the same for each group. The Piagetian children's direct statements were mostly commands (84.21%) in the C + S + A category, with the remainder being 10.53% autonomous and 5.26% suggestions. The variation of Ausubelian children's direct statements, on the other hand, was more evenly dispersed between commands (22.22%), suggestions (44.45%), and autonomous (33.33%) categories. Further comparisons between programs are unnecessary since, in this case of the Piagetian group, few utterances were of the IS, DQ, or IQ types.

The percentages in the next category (ST) indicate that the Ausubelian children's task management utterances were structured 27% of the time. The Piagetian children did not structure task management utterances.

Similar patterns between programs are seen once again in the third category group (D + I) where the utterances of children in both programs were much more often direct than indirect.

In the last category (Q), qualification for task management utterances is provided in only one instance, that of the Ausubelian children's direct statements. None of the Piagetian children's task management utterances were qualified. This contrast between the children held true during small group learning periods as well (see Table 6).

V

# DISCUSSION

Results from the questionnaire will be discussed first, followed by the data obtained from coding the videotapes of the teacher-child verbal interaction during small group and related learning activity sessions.

## Questionnaire Results

First, the responses from teachers in each program suggest that each group of teachers were in accord regarding theoretical and methodological principles which seem to apply particularly to the respective programs.

Second, the Ausubelian teachers did strongly endorse Ausubelian items. The Piagetian teachers also endorsed, though not as strongly, items which related to their own program. However, they endorsed several of the Ausubelian items as well. The most likely explanation for this is that the items endorsed referred to a degree of structure the Piagetian teachers would likely support. Small group instructional sessions in the Piagetian program do have quite a high degree of structuring, and this is reflected in the results of the analysis of teacher utterances during these sessions. Children were free to choose their own activities as well as choose what to do with the materials involved during free rotation ("activity centers") and "free play" time. It was also observed that the verbalizations occurring during these subsequent learning activities were not the same as those occurring during small group learning sessions.

The teacher-child verbalizations and verbal interaction which occurred during the small group learning sessions tended to be more direct than at other times. This point is further supported by the fact that Piagetian teachers endorsed most of the "neutral" items. Five of these also referred to structure in the program and were strongly endorsed.

Further analysis of the exact phrasing and terminology of each questionnaire item could uncover additional explanations for the way in which the teachers scored them. For example, items in one category may have provided more qualification than items of other categories; or items may be worded more extremely or emphatically in one category than in others.

## Videotape Results

### Small Group Learning Sessions

During small group learning activities, the tendency for teachers in both groups was to use far more direct types of utterances than indirect.

In the Ausubelian classroom, this was expected. Teachers in this program intended to relate concepts to the children in the form of advance organizers. Organizers are taught in an expository fashion (teacher-directed) and therefore, it can be expected that many verbalizations will be direct. However, on the basis of the questionnaire responses, it was predicted that more indirect statements and questions would be used (only 6.3% of all utterances were indirect). It had been expected, however, that Piagetian teachers would use more indirect type utterances than was the case.

The types of direct utterances used in the two programs, however, were different. While the Ausubelians tended to use almost twice as many direct statements as direct questions, there was a more equally balanced

distribution between direct statements and questions in the case of the Piagetian teachers.

The ways that the teachers in both programs managed their small group time were similar in that they were mostly teacher-directed. The teachers had certain concepts which they intended to present to the children. But whereas the Ausubelian teachers used an expository approach, the Piagetian teachers used an approach that might be described as guiding by the use of direct questions. It is possible that Piagetian teachers intended to be more indirect in their teaching than was the case, or provide more opportunity for child-directed learning.

It may well be that Piagetian teachers interpret a questioning approach as being indirect; even though the questions are posed in a direct fashion. An examination of the protocols indicated that, for this group of teachers, initial indirect questions quickly change to direct questions. "Do moons melt snow that you know of? Do you know where he put the snowman so he would not melt?" are two examples of direct questions which seemed to be intended to be indirect. They were categorized as direct questions because if the children responded incorrectly, usually further related direct questions were asked; and children were often reminded of information (e.g., in a story) that would help in producing a correct answer. However, it is interesting to note that most of the time, these teachers did not supply correct responses if one was not forthcoming.

Verbalizations by Ausubelian teachers were more widely distributed across categories of utterances than was the case for Piagetian teachers. First, the proportions of process (P), content (C), or process and content (P/C) utterances were consistent within the aims of the program.

The type of advance organizer being presented during each small group learning session necessitated a certain sequence of utterances. If the organizer was a content organizer (e.g., social studies, math, language), then the majority of the utterances did, in fact, deal with content. If the organizer provided information pertaining to processes of thought (e.g., classification, seriation) then the utterances mainly referred to the processing of content. Since these advance organizers dealing with process concepts also related to subject matter, a small percentage of statements also made reference to content.

From the questionnaire results, it is clear that the Piagetian teachers confirmed the Piagetian derived principle of encouraging the development of operations (i.e., logico-mathematical knowledge). However, during small group learning activities, there was an almost total absence of utterances referring to process. The emphasis was moreso on <u>figurative</u> learning. Now such learning does not itself include <u>operative</u> (process) learning--such as how to classify. Figurative learning is necessary. It is a condition for "getting to know about objects and events." The eventual culmination of such learning are those special interactions which lead to the internal structuring of operations; that is, operative learning. Children are concerned with objects in the here and now, so are more disposed to engage in figurative learning. And the Piagetian teachers might also be more disposed to engage in <u>identification</u> type exercises. Much of this type of activity involves physical knowledge, which according to a Piagetian teaching philosophy, can be <u>directly</u> referred to. The teacher holds back from (refuses) referring to logico-mathematical knowledge (i.e., operative). Thus, there may arise a dis-

parite emphasis on types of learning. A much closer look needs to be taken at this relationship.

Teacher utterances in both classrooms tended more often to be specific than to deal in generalities (on average the ratio for Ausubelian teachers was 7%:93%, and for Piagetian teachers, 10%:90%). This ratio can be expected fo Piagetian teachers. The expectation is that the process of learning is from the specific to the general. A higher percentage of utterances referring to general ideas (superordinate concepts and propositions) had been expected to be used by Ausubelian teachers. The general utterances used were part of advance organizers which introduced new concepts, or were in the beginning of any of the organizers. It had been stated in the Ausubelian program rationale, that, in applying the subsumption theory of learning to early childhood education, each general idea introduced should be accompanied by a goodly number of concrete "props" (concrete exemplars). From an inspection of the protocols for the advance organizer lessons (small group) it appears that, in some cases, teachers overcompensated in the application of this principle. It was clear that many children appeared to understand a general idea, but were, nevertheless, provided with extra concrete exemplification.

With reference to divergent and convergent thinking, it was predicted the Ausubelian teachers would tend to encourage mainly convergent thinking (especially during advance organizer lessons) since this is associated with the nature of progressive differentiation. The Piagetian teachers were expected to encourage divergent thinking moreso than convergent. The proportion of utterances used by Ausubelian teachers re-

ferring to convergent thinking, as compared to divergent thinking, lends some support to this prediction. At the same time, the preponderance of utterances encouraging convergent thinking suggests an unwarranted emphasis in this direction given the overall objectives of the program. The purposes of the Piagetian small group periods were different from those of the Ausubelian classroom, and this was reflected somewhat in the proportions of utterances referring to divergent and convergent thinking. If indirect types of utterances are ignored, since they account for only 28 out of 448 total utterances, an average 11% of utterances were encouraging divergent thinking, compared to 89% which encouraged convergent thinking. However, in the case of direct question type utterances, the ratio was 19%:81%, respectively. When using direct statements or questions the Piagetian teachers tended to encourage convergent thinking. This pattern most likely served purposes similar to those of the Ausubelian's; that is, to direct the child's attention to particular objects and events. When using indirect statements, there was more emphasis on divergent thinking. Even so, a greater percentage of utterances favoring divergent thinking was expected. From the results of the questionnaire, it was clear the Piagetian teachers strongly favored the promotion of curiosity and exploration in the young child's thinking. However, it is clear that the relationships and interplay between such types of thinking need much closer analysis.

Types and frequencies of child verbalizations and verbal interactions will be compared in two contexts: (a) between and (b) within both programs and can be briefly summarized.

Small Group Learning Activities

First, 98% of Ausubelian children's utterances were a direct type

of utterance, and almost all of these were direct statements rather than direct questions.

Second, this pattern of speech held true for the Piagetian children also. There was also little variation in the category of utterances for both groups of children. Almost all referred to content, in specific terms, and were associated with convergent thinking.

Although the Piagetian children engaged in some divergent thinking when asking direct questions, only 11 out of 167 utterances were associated with such thinking.

What do these frequencies seem to imply? By comparing Tables 3 and 4, it can be seen that the ratio of children's utterances compared to those spoken by the teachers in both programs was about the same: A = 245:871, or 28%, P = 167:448, or 37%. However, whereas the teachers, on average used 60% direct statements and 40% direct questions, children used 93% direct statements, and only 7% direct questions (which accounts for almost all questions asked). There is also a wider distribution of teacher statements by category than for children. Although Ausubelian teachers give some emphasis to references of process and superordinate concepts, and Piagetian teachers to statements referring to divergent thinking, at least within the time allotted to small group learning activities, there is no evidence that children reciprocate in their patterns of speech. This is not surprising. These sessions were mainly teacher-directed. Ausubelian children were often asked to identify particular examples of general concepts and the Piagetian children were sometimes encouraged to engage in divergent thinking. Data pertaining to the small group learning activities suggest some influence

from teachers' statements in P and DT categories. Ausubelian children, albeit infrequently, did make reference to process and to general concepts, and Piagetian children did ask some direct questions which were of a divergent thought nature. This tendency is more pronounced for related learning activities. During these activities the children have more scope for instigating learning behavior.

Related Learning Activities

It is clear from the results in Table 3 that during related learning activities, teachers in both programs used direct types of statements more often than indirect types. For Ausubelian teachers, the number of indirect statements used was 10% of total utterances, and for Piagetian teachers, 6%. The ratio of direct statements to direct questions was similar to that observed for small group instruction. The reasons are likely to be the same. For Piagetian teachers, distribution of types of utterances by category is also similar to that observed in small group instruction. In the case of Ausubelian teachers, there is now slightly more emphasis on references to content and specific information, but a slight change in number of utterances encouraging divergent thinking. For this category, there is now little difference in number of utterances used by both groups of teachers (A = 8% and P = 9%).

The fact that the percentage of utterances in each program is so close was unexpected. According to theory and the results of the questionnaire, it was expected that the Piagetian related learning activities would be much less structured than appears to be the case. The children are allowed to choose any area of the room as well as any activity within the area, while the teachers place themselves within these various areas in order to observe the children. At times they would participate in

the children's activities by encouraging exploration and discovery through divergent types of conversation and thought. Direct observation, however, denotes that this type of conversation did not, in fact, occur very often. Thus, although children's movement was unrestrained, when teacher-child verbal interaction occurred, the teacher tended to direct the child's behaviors. Again, although more questions than statements were used, they tended to be direct.

The distribution of utterances by category for Ausubelian teachers supports the expected variation. Most of the "teaching" should occur during the small group learning periods, where subsequent related learning periods serve as time for reinforcement of concepts and teacher evaluation. Therefore, a greater proportion of process concepts was expected and did occur during small group learning periods compared to related activity periods.

The Piagetian teachers dealt with concepts which were almost always content oriented (98% during small groups, 100% during related learning activities). The fact that the Piagetian teachers make infrequent reference to process may be due to a number of reasons: (a) emphasizing particular content and trying to encourage the child to pay attention to attributes, (b) using "clue" type statements that are intended to encourage the child to engage in an exploration of relations [e.g., "What can we do with these--(colored geometric blocks)? What do you notice about this--(yellow circle)? What do you notice about that--(yellow circle)?"] In the latter case, the teacher's intention was that the child might see the relation between the two blocks. However, when such statements or questions were used they were seldom pursued so that a definite processing of information, in terms of operations, occurred. This may be due to an interpreta-

tion of the development of self-constructed logical knowledge which assumes that the young child, over quite long time periods, being exposed to objects and events that do share characteristics (properties) will make the connections more covertly than overtly. The data on teachers' utterances do not allow for any further interpretation of intention or consequence.

Although the Ausubelian teachers verbalized more often during both small groups and related learning activities, the number of utterances by children in each program was about the same. Children from both programs tended to use more direct statements than any other type (Ausubelians used 79%; Piagetians, 79%). Children in the Ausubelian program used more indirect utterances (12%; mainly indirect statements) than Piagetian program children (3%; indirect statements).

Of particular interest is the wider distribution of utterances by category in the case of Ausubelian group children compared to the Piagetian group children. However, two clear-cut, contrasting emphases can be discerned from the results in Table 4. With respect to direct statements only, there is a decided tendency for Ausubelian group children to use utterances referring to process as well as content (23% compared to 77%). This tendency is an increase for the Ausubelian children in comparison to their use of such utterances during small groups (12% compared to 88%). Perhaps this was because they now had more freedom to determine what materials to manipulate, and how to work with them, and possibly had greater chance to speak than during the small group learning period. The teachers often asked the children to justify their manipulations during the related learning activities, and this would require the children to

include process information.

Direct observation shows that utterances in the process categories are absent from the speech of Piagetian group children. Piagetian group children, however, used more utterances referring to divergent thinking (10%) than did the Ausubelian group children (1%). Thus, during related learning activities, which are more child-directed than teacher-directed, children in each program do appear affected by a modelling influence from their teachers, or from the structure of the respective programs.

Task Management During Small Group Learning Sessions

Teachers in both the Ausubelian and Piagetian programs used approximately the same number of task management utterances during small group learning activities which were mainly direct utterances. However, the split between direct statements and direct questions was different for the two groups. Ausubelian teachers dealt with task management by using mainly direct statements. Their use of task management utterances seemed fairly consistent with expectations derived from Ausubelian theory and pedagogical principles determined to be appropriate for the Ausubelian program. Expository teaching is mainly teacher-directed and during related activities the teacher would often instruct the children how to manipulate materials. These manipulations aid in facilitating concept attainment, as well as serving as reinforcements, once the concepts are understood. It would be expected that the Ausubelian teachers' instructions would be direct in order to be simple and concise, and in a style most likely to aid the child's learning processes.

The fact that direct statements occurred more often than direct questions (88% compared to 12%) is also congruent with expository teach-

ing; so is the fact that the Ausubelian teachers qualified their task management utterances more often than did the Piagetian teachers. In other words, they provided reasons or justification for proceeding with the task management in a certain way. The expository teaching of these justifications would provide these qualifications. (For example, "You could put the bird with the group of animals because a bird in an animal."; "Put the strawberries in this basket, because they are fruit."; and "This basket has all the food; that is fruit.") It was expected that the Ausubelian teachers would provide qualification to their task management instructions in order to facilitate the child's understanding of why he is doing what he is doing to complete a given task. These justifications most likely included reminding statements derived from the concepts outlined in the advance organizers of the Ausubelian program.

The amount of teacher utterances used for task management was unexpected in the case of the Piagetian teachers. Comparing the amount of utterances used for task management is of interest: A = 17%; P = 28%. Thus, in small group learning activities, there was more teacher-direction by Piagetian teachers than by Ausubelian teachers, even though the Piagetian teachers used more direct question type utterances for this purpose (31% compared to 13%). The fact that direct questions tended to form suggestions rather than commands (which seemed to be more direct) gives support to their intentions of maintaining an open, rather than structured framework.

However, the fact that the Piagetian teachers structured their task management utterances more often than the Ausubelian teachers was also unexpected. That is, they told the children how they could manage the

tasks before them; how to manipulate the materials (e.g., "Maybe if you put the biggest one on the bottom it would look right." "You could put all the red beads together in a group in the red box."). Although the words like maybe and could suggest an indirectness of approach (the possibility of alternatives), children did not appear to interpret such statements in that way. They proceeded directly to do what the teacher suggested, and teachers did not attempt to restructure the child's behaviors. The act of putting red beads in a box did not turn out to be a "process" so much as directly following an instruction to constitute the group of red beads. Therefore, it was not clear if the child was aware of a process in this instance.

In summary, Table 5 presents some surprising results. The Piagetian teachers used almost as many task management utterances, and proportionately more than the Ausubelian teachers. In both classrooms, the utterances were of a direct form. In addition, the Piagetian teachers structured their task management utterances proportionately more often than did the Ausubelian teachers.

These results are more supportive of Ausubelian teachers' stated teaching methodologies than the Piagetian teachers' stated teaching methodologies.

Data in Table 6 make it very clear that children in both programs rarely used task management utterances during small group learning periods. After considering the very small proportion of child task management utterances to the total number of teacher-child verbalizations, it is almost impossible to make any well founded conclusions. Only tentative observations and interpretations can be offered.

In the Ausubelian small group learning periods, the children were mainly concerned with receptive learning. The task management utterances which they did make were most likely spoken in a context within which they were manipulating the props presented in the advance organizer. They were spoken in the most simple means, which as explained before, were predominantly direct statement type utterances. One-half of the utterances were commands (C), one-third were suggestions (S), and the remainder autonomous (A).

The Piagetian children's utterances had less variation between types and categories of types of utterances. Their task management utterances were 100% direct statements, 73% which were in the form of a command (C). The Piagetian children's task management utterances entailed less structuring than the Ausubelian children's. This was true even though the Piagetian teachers structured their task management utterances proportionately more often than did the Ausubelian teachers.

The Piagetian children also provided no qualification at all for their instructions, whereas the Ausubelian children included qualification 8% of the time. This data pertaining to qualification suggest some influence from teachers' statements regarding task management, whereas the data pertaining to the proportion of structuring used by teachers and children contradict any such influence affecting the children. That is, in the case of qualifying task management, the Ausubelian teachers qualified more often than the Piagetian teachers, and the Ausubelian children more than the Piagetian children. But whereas the Ausubelian teachers provided less structure (ST) to their utterances than did the Piagetian teachers, the Ausubelian children still provided more structure

than the Piagetian children did.

Task Management During Related Learning Activities

Results pertaining to task management utterances used by teachers during small group learning activities are very similar to those used in related activities. The distributions of utterances by type, for related activities versus small group activities, as presented in Table 5, differ. First, the Ausubelian teachers' utterances dealt with task management more often than the Piagetian teachers in terms of both frequency of task management utterances and the proportion of task management utterances to the total number of teacher utterances for each program. This is the opposite case from the comparison for small group learning periods. During those periods the proportion of Piagetian teachers' utterances which were task management was much greater than that of the Ausubelian teachers.

Second, comparing the proportion of teacher utterances which were task management between small group and subsequent learning periods reveals contrasting changes in teacher verbalizations within and between programs. The proportion of Ausubelian teacher utterances which comprised task management increased when the teachers were in the related learning activity sessions. The proportion of Piagetian teacher utterances which comprised task management decreased when teachers were in the related learning activity sessions. Therefore, even though the Piagetians used proportionately more task management utterances during small group learning periods, the opposite was true during subsequent related learning activity periods.

A look at the activities comprising the related learning period

offers some explanation for this phenomena. The teachers in the Ausubelian program often assisted the children when they were manipulating materials designed to reinforce concepts presented in former learning sessions. Therefore, although there was considerable child-directed activity, teachers were likely to provide instructions regarding task management when a situation called for it. These instructions were usually suggestions rather than commands. Sometimes the instructions were structured, and occasionally included qualification.

On the other hand, the Piagetian teachers offered assistance less frequently. According to theory, the Piagetian teacher occupies herself with asking "open-ended" questions which encourage divergent thinking. The data suggest that the Piagetian teachers' task management utterances were quite often oriented towards encouraging divergent thinking, even though they were in the form of statements more often than questions, and always direct rather than indirect. Most of the task management utterances were not structured. Also, they rarely provided qualification. This may have been due, again, to an intention not to directly influence the ultimate course of children's overt behavior and thinking.

Results in Table 6 show that the number of task management utterances made by the Ausubelian children during related activity periods was almost twice that of the Piagetian children. Since both groups of children made almost the same number of utterances to begin with, it is apparent that Ausubelian children spoke twice as often with respect to task management than the Piagetian children. This is probably due to the fact that the Ausubelian children were more often occupied with specific task oriented projects requiring this type of verbalization.

This was not the case in the Piagetian classroom where the children were free to choose from a wider variety of types of activities and not required to necessarily complete a task in the sense of arriving at a conclusion.

It is evident in both programs that during the related activity period, there was a wider distribution between the types of direct statement utterances. The direct vs. indirect category of type of utterance gives further indication of a reliance of direct forms of speech when dealing with task management. This is true for all task management utterances in general. That is, teachers and children, during small group or related activity sessions, use direct types or categories of direct utterances, when speaking in the context of task management.

The group of categories illustrating C + S + A shows that the Ausubelian children provided more variation between these categories during related activities than did their teachers, or their Piagetian counterparts. This is likely due to two related factors. First, related activities in the Ausubelian program are highly structured by the teacher. This structure requires children to apply learning from advance organizer lessons to a number of related activities. There is scope for exploration (suggestion) and individual selection in cooperation with the teacher. For example, a child may be selecting an activity or determining what he is about to do with the materials at hand. He would state his intentions and thoughts. He may say, for example, "I think I'll put these (birds) in this square like this," or "I'm going to give my plant a lot of water." These types of utterances would be labelled autonomous (A), because the child is telling the methods of task management he has just

come up with.

Children also often work on tasks in pairs or small groups at this time. They frequently use command instructions to each other at this time.

In the Piagetian classroom, children can select from a range of activities and movement is usually unrestricted. Many of the children's statements are in terms of command in this program, too: "I need that; give me that." Nevertheless, it is surprising that few utterances are either suggestions or related to autonomous activity. There is no straightforward explanation for this. The best explanation seems to be that Piagetian children moved considerably more in related activity periods than Ausubelian children. There seemed to be more need to assert starting points. For example, a child may join a group of children who are painting and the first thing he would say would be "Give me a paint brush," or "I want the red paint."

Other trends became apparent when comparing (a) related learning activity periods vs. small group learning sessions, and (b) children's vs. teachers' task management verbalizations. The trends can be seen in studying the categories indicating the proportion of task management utterances which were structured (i.e., telling how to carry out the task), and those which were qualified (i.e., they provide reasons why the task should be managed in a certain way). It is evident that the Ausubelian children make use of utterances in both categories whereas the Piagetian children never made use of either category type at all.

This greater frequency of structured and qualified task management utterances used by the Ausubelian children compared to the Piagetian chil-

dren was a characteristic also apparent in the teachers' utterances during both time periods.

These findings are one more indication of some influence of teachers' verbalizations. Perhaps the children are modelling or imitating certain speech patterns as seen here in the context of task management utterances. The data provided lend some support to this conclusion. It was the case that only Ausubelian children were exposed to teacher task management utterances which had the qualities of structuring and of qualifying. Theoretical implications for proposed pedagogies in each program accounted for these differences. The Piagetian teachers did not, in fact, structure or qualify their task management utterances to their children as frequently as the Ausubelian teachers did; that is, they did not tell how to manage their tasks, nor provide reasons why. In view of this data, it seems reasonable to infer that the Ausubelian children were able to provide more structure and more qualification because they had been exposed to it more often and, indeed encouraged to use this type of communication when interacting with each other.

## Summary

It was seen in the results of the questionnaire that the Ausubelian teachers strongly endorsed only Ausubelian items. The Piagetian teachers also endorsed, though not so strongly, items which related to their own program. However, they endorsed several of the Ausubelian items in addition to their own. It was suggested that the most likely explanation for this is that the items endorsed referred to a degree of structure the Piagetian teachers would likely support. Small group instructional sessions in the Piagetian program do have quite a high degree of structuring and this was discussed in the results of the analysis of teacher utterances

during these sessions.

The structure of the small group sessions in both programs was mainly teacher-directed. Though Ausubelian teachers gave some emphasis to reference of process and superordinate concepts, and Piagetian teachers to statements referring to divergent thinking, at least within the time allotted to small group learning activities, there was no evidence that children reciprocate in their speech patterns.

During related learning activities, the fact that the percentages of teacher utterances in each program were so close was unexpected. According to theory and results of the questionnaire it was expected that the Piagetian related learning activities would be much less structured than appeared to be the case. The distribution of utterances by category for Ausubelian teachers supports the expected variation for their program. In addition, direct observation showed that during related learning activities (which were more child-directed than during small group sessions) children in each program appeared to be affected by a modelling influence from their teachers or from the structure of their respective program.

With regard to utterances which made reference to task management, the Piagetian teachers were found to use proportionately more task management utterances than the Ausubelian teachers during small group sessions. In both classrooms the utterances were in a direct form. In addition, the Piagetian teachers structured these utterances proportionately more often than the Ausubelian teachers. These results are more supportive of Ausubelian teachers' than Piagetian teachers' (stated teaching methodologies).

Even though the Piagetians used proportionately more task management utterances during small group learning periods, the opposite was true during subsequent related learning activities: Ausubelian teachers' task management utterances increased; Piagetian teachers' task management utterances decreased. In addition, the variation between categories was different between and within programs. A look at theory and the activities which comprised the related learning activities period offered some explanation for these phenomena.

In both programs the children's utterances rarely made reference to task management during small group learning sessions. Therefore, no conclusions were made. However, during related learning activity periods the Ausubelian children referred to task management twice as often as the Piagetian children. The fact that the Ausubelian children, more often than the Piagetian children, were occupied with specific task oriented projects requiring such types of communication was suggested to account for these observations.

It was evident in both programs that it was necessary for all task management verbalizations (teachers' and children's) to incorporate direct types and categories of direct utterances when speaking in the context of task management.

Several trends were cited when comparing (a) related learning activity periods with small group learning sessions, and (b) children's vs. teachers' task management verbalizations. The Ausubelian children provided more variation in the first group of categories (C + S + A) than did their teachers or Piagetian counterparts. Two related factors were offered in explanation when comparing the Ausubelian to the Piagetian program:

In the Ausubelian program (a) related learning activities are more highly structured and (b) there is more organized group learning activity on defined tasks during these periods when children are strongly encouraged to interact in managing a task to completion. There was also a greater frequency of structuring and qualification given to the task management utterances of the Ausubelian children in comparison to the Piagetian children; a characteristic also apparent in the teachers' utterances during both time periods. These findings are one more indication of some influence of teachers' verbalizations.

A final note seems in order. It is clear that some dichotomy existed between each group of teachers' endorsements of statements referring to theory and practice of early childhood education and to child development; how they actually organized their respective programs and the teaching roles they adopted. This is apparent from a comparison of the results of the questionnaire and data pertaining to instructional and task management utterances. In the laboratory situation, a more careful, ongoing monitoring of teacher behaviors, with continuous and immediate feedback, could lead to adaptive modifications in the practice of teaching to bring it more in line with stated program objectives.

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## Appendix A

The intent of this questionnaire is to collect information regarding the teacher's evaluation of teacher role, child role, classroom organization, behavioral objectives, and content curriculum in the Piagetian and Ausubelian preschool program at the University of Wisconsin Preschool Laboratory.

Please read each of the following statements, and decide whether you (a) feel it is related to the objectives of your program, and (b) to the educational theory your program is based on.

Read the five types of responses on the following scale from 5 to 1. For each statement in the questionnaire, decide which of the five responses is most applicable.

Indicate your choice by circling the appropriate number on the scale to the right of each statement.

Scale:

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| Strongly agree with this statement. | Agree with this statement. | Neither agree nor disagree with this statement. (not applicable or neutral) | Disagree with this statement. | Strongly disagree with this statement. |

| | | |
|---|---|---|
| 1) | Children often look to teachers for help or for answers. Therefore, teachers should be ready to correct wrong answers or misconceptions on the part of the child. | 5 4 3 2 1 |
| 2) | The teachers ask open-ended questions which require no specific answer, but are intended mainly to stimulate thought. | 5 4 3 2 1 |
| 3) | The child is encouraged to interact with other children and to resolve conflicts among themselves. | 5 4 3 2 1 |
| 4) | Normally, a teacher tells a right answer and reinforces it, only when dealing with social knowledge (in contrast with physical and logico-mathematical knowledge). | 5 4 3 2 1 |
| 5) | As higher levels of logical reasoning are attained, verbalization becomes an integral part of the abstraction process and language and thought grow inextricable from each other. | 5 4 3 2 1 |
| 6) | Language enables the child to deal with relationships by meaningfully using words which signify concepts. | 5 4 3 2 1 |
| 7) | In physical knowledge, the teacher encourages the child to find the answer directly from objects. | 5 4 3 2 1 |
| 8) | Teachers consciously concern themselves throughout the day with arranging the environment, making a variety of materials available, facilitating children's activities, meeting individual emotional needs, promoting interactions among children, helping them resolve conflicts, and providing opportunities for motor development. | 5 4 3 2 1 |
| 9) | The teacher provides exemplars which illustrate the criterial attributes of serial order. | 5 4 3 2 1 |
| 10) | The teacher should mainly ask open-ended questions. This is because the children are at varying stages of development so that there are no right or wrong answers. Rather, there are alternatives. | 5 4 3 2 1 |
| 11) | Language makes possible a representation of ideas and verbal concepts which are, in that form, more manipulable and transferable. | 5 4 3 2 1 |

| | | |
|---|---|---|
| 12) | In logico-mathematical knowledge, the teacher refrains from telling the right answer. | 5 4 3 2 1 |
| 13) | The child learns about the world around him through his senses, seeing, hearing, feeling, tasting and smelling and through his kinesthetic sense. The greater the input of sensory impressions, the more material he has out of which to build concepts of what the world is like. | 5 4 3 2 1 |
| 14) | Experience in applying high-level subject matter concepts and high-order rules presented verbally must be followed by many and varied related activities which afford opportunity to overtly manipulate concrete learning materials. | 5 4 3 2 1 |
| 15) | Subject matter is chosen which is considered consistent within the child's present environmental experience. | 5 4 3 2 1 |
| 16) | The program teaches verbal expression abilities. | 5 4 3 2 1 |
| 17) | Our program teaches to content as well as to process. The first consideration is to find content that interests and fascinates children. | 5 4 3 2 1 |
| 18) | The art of teaching begins with how to provide ideas to the children. The more the children become involved with content, the more new connections they will make, and their logico-mathematical structure naturally develops. | 5 4 3 2 1 |
| 19) | Because it is expected that learning evolves in sequentially dependent hierarchies, early learning must be confirmed, or corrected by feedback. | 5 4 3 2 1 |
| 20) | The program incorporates as goals the development of both content and process of thought. | 5 4 3 2 1 |
| 21) | The teacher encourages the children to construct their own preoperational knowledge and to go through many different ways of being "wrong." | 5 4 3 2 1 |
| 22) | In order to ask the necessary open-ended questions, the teacher is to be continually aware of the theoretical implications of the child's actions and interpretations of events. | 5 4 3 2 1 |

| | | |
|---|---|---|
| 23) | Group games are important for physical development, energy release, or entertainment. | 5 4 3 2 1 |
| 24) | The teacher encourages the children to do as much of the thinking as possible, so that operational and representational knowledge might develop. | 5 4 3 2 1 |
| 25) | It is necessary for children to manipulate objects in order to develop their physical, logico-mathematical, and spatial knowledge, because it is only by dealing with reality that children transform reality. | 5 4 3 2 1 |
| 26) | One of the ways a teacher-planned activity is introduced in our program is simply to put out the materials and let the children use them in a spontaneous fashion. | 5 4 3 2 1 |
| 27) | Content is arranged sequentially so that relationships exist between initially presented subject matter concepts and those experienced subsequently. | 5 4 3 2 1 |
| 28) | It is inappropriate to attempt to teach logico-mathematical construct. | 5 4 3 2 1 |
| 29) | Large group time is used for children and adults to develop a community feeling. | 5 4 3 2 1 |
| 30) | There is no clear distinction between "content" and "process" (i.e., intellectual operations) in the curriculum. | 5 4 3 2 1 |
| 31) | From the long-range developmental point of view, children who constantly use their initiative to figure out things to do are more likely to learn more meaningfully, and go on creating new ideas. | 5 4 3 2 1 |
| 32) | Language helps to focus on concepts and to retrieve them. It does not <u>in itself</u> help to develop concepts. | 5 4 3 2 1 |
| 33) | The program incorporates as a goal, the long-term acquisition and retention of stable, organized and extensive process concepts. | 5 4 3 2 1 |
| 34) | Content is arranged so that the child can learn hierarchical relationships between classes of objects and events. | 5 4 3 2 1 |
| 35) | During large group sometimes teachers tell stories or an upcoming event is reviewed. | 5 4 3 2 1 |

36) It is only when there is something intrinsically interesting that children are alert and curious. 5 4 3 2 1

37) Large group facilitates social interaction and an atmosphere of respect for individual differences. 5 4 3 2 1

38) While each small group activity has its own objectives, the overall rationale for including a small group time is to ensure the social interaction of every child. 5 4 3 2 1

39) The expository teaching used in our program <u>may</u> result in critical thinking and problem solving. 5 4 3 2 1

40) The teacher does not attempt to organize particular content for children. Whatever is told them is bound to be assimilated in ways that are different from our adult notions. 5 4 3 2 1

41) Large group activities are related to prior small group learning activities, on some occasions. 5 4 3 2 1

42) Our program provides a place for both discovery learning and meaningful reception learning in the individual child's range of learning modes. 5 4 3 2 1

43) Social studies concepts are sometimes presented in a large group time. This area covers ideas about the self-concept, interpersonal relations between children, and between children and adults. 5 4 3 2 1

44) Our selection of content includes counting to ten, recognizing number and letter symbols, reciting one's address and telephone number and naming colors, shapes, and animals. This selection reflects learning as a process of adding more and more bits to the child's store of information and skills. 5 4 3 2 1

45) Our program incorporates a greater use of meaningful reception learning where principles important in the formation, abstraction, transfer, and retention of concepts are presented to the learner. 5 4 3 2 1

Appendix B

| Teacher | | | | | | | | Child | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Verbal Interaction | | | | Task Management | | | | Verbal Interaction | | | | Task Management | | | |
| DS | P | G | D | C | | D | | DS | P | G | D | C | | D | |
| IS | C | S | C | S | ST | I | Q | IS | C | S | C | S | ST | I | Q |
| DQ | P/C | | | A | | | | DQ | P/C | | | A | | | |
| IQ | | | | | | | | IQ | | | | | | | |
| DS | P | G | D | C | | D | | DS | P | G | D | C | | D | |
| IS | C | S | C | S | ST | I | Q | IS | C | S | C | S | ST | I | Q |
| DQ | P/C | | | A | | | | DQ | P/C | | | A | | | |
| IQ | | | | | | | | IQ | | | | | | | |
| DS | P | G | D | C | | D | | DS | P | G | D | C | | D | |
| IS | C | S | C | S | ST | I | Q | IS | C | S | C | S | ST | I | Q |
| DQ | P/C | | | A | | | | DQ | P/C | | | A | | | |
| IQ | | | | | | | | IQ | | | | | | | |

Tape Number:
Date:
Ausubel--Piaget
Small Group--Related Learning Activities

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